

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent No. : US RE39,021 E  
Issue Date : March 21, 2006  
Patentee : Philip G. Sweeny  
Title : Hydantoin-Enhanced Halogen Efficacy In Pulp And Paper Applications  
TC/A.U. : 1724  
Confirmation No. : 4720  
Docket No. : 1686-400 REX/RES  
Dated : October 1, 2010

**Certificate of EFS-Web Transmission**

Commissioner for Patents  
PO Box 1450  
Alexandria, Virginia 22313-1450

I hereby certify that this correspondence is being transmitted to the U.S. Patent and Trademark Office via the Office's electronic filing system on **October 1, 2010**.

E. Wangelin  
(Printed Name)

/E. Wangelin/  
(Signature)

**AMENDED REQUEST FOR CERTIFICATE  
OF CORRECTION OF PATENT PURSUANT TO 37 C.F.R. § 1.323**

Sir:

Please issue a Certificate of Correction in accordance with 37 C.F.R. § 1.323 to correct the errors in the patent as set forth hereinbelow and on the enclosed copy of Patent Office Form PTO-1050.

**IN THE PATENT:**

**Column 7, line 51:**

Claim 2:

Now reads: "The method of claim 1 wherein..."

Should read: -- The papermaking process of claim **14** wherein --

**Column 7, line 54:**

Claim 3:

Now reads: "The method of claim 1 wherein..."

Should read: -- The papermaking process of claim **14** wherein --

**Column 7, line 56:**

Claim 4:

Now reads: "The method of claim 1 wherein..."

Should read: -- The papermaking process of claim **14** wherein --

**Column 8, line 1:**

Claim 8:

Now reads: "The method of claim 1 wherein..."

Should read: -- The papermaking process of claim **14** wherein --

Patentee submits that the errors noted above occurred through no fault of the Patentee. The amendments to claims 3, 4 and 8 made in the Amendment After Final Action (37 C.F.R. Section 1.116) dated November 18, 2003 were not made upon printing of the Reissue Patent. A copy of the November 18, 2003 Amendment is attached for your convenience as Exhibit A. Claim 2 was not amended in the reissue prosecution and should be identical to Claim 2 as set forth in Reexamination Certificate B1 5,565,109, a copy of which is attached as Exhibit B. The Status of Claims in the November 18, 2003 Amendment (page 8) correctly identifies Claims 2, 3, 4 and 8 as allowed in the reissue application. Accordingly, no fee is due in view of the printing error. However, if any additional fees are due, please charge our Deposit Account No. 08-2461 for such sum.

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Issue Date: March 21, 2006  
Attorney Docket No.: 1686-400 REX/RES  
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It is respectfully requested that a Certificate of Correction be issued to correct the errors in the above-identified patent.

Respectfully submitted,

/glenn t. henneberger/  
Glenn T. Henneberger  
Registration No.: 36,074  
Attorney for Patentee

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# **EXHIBIT A**



Express Mail Label No. 11-18-03  
2340064245 US

Docket No.: 05408/000A237-US2  
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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TC 1700

In re Patent Application of:  
Philip G. Sweeny

Application No.: 10/044,594

Art Unit: 1724

Filed: January 10, 2002

Examiner: Peter A. Hruskoci

For: HYDANTOIN-ENHANCED HALOGEN  
EFFICACY IN PULP AND PAPER  
APPLICATIONS

AMENDMENT AFTER FINAL ACTION (37 C.F.R. SECTION 1.116)

MS AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**INTRODUCTORY COMMENTS**

In response to the Office Action dated July 18, 2003 (Paper No. 8), please amend the above-identified U.S. patent application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Application No.: 10/044,594

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Docket No.: 05408/000A237US2

Applicant submits herewith:

- 1) A Substitute Reissue Application Declaration;
- 2) A copy of Applicant's Amendment dated February 3, 1999, in Application No. 90/004,700 (Exhibit A);
- 3) A copy of Applicant's Amendment dated May 20, 1999 submitted in Application No. 90/004,700 (Exhibit B); and
- 4) Status of claims and support for claim changes, pursuant to 37 C.F.R. 1.173(c).

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Docket No.: 05408/000A237US2

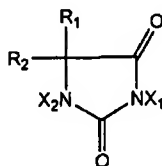
## AMENDMENTS TO THE CLAIMS

Please amend the following claims in this reissue application pursuant to 37 C.F.R. § 1.173(b) as shown below. A complete listing of the status of the claims and support for claim changes, pursuant to 37 C.F.R. 1.173(c) is attached.

3. (Amended) The papermaking process of claim 16, ~~14~~ wherein the slimicide is chlorine gas or sodium hypochlorite.

4. (Amended) The papermaking process of claim [16] 14 wherein from 0.1 to 10 ppm of active slimicide (expressed as Cl<sub>2</sub>) is maintained in the circulating water slurry.

8. (Amended) The papermaking process of claim [16] 14 wherein said slimicide is a halogenated hydantoin of the formula:



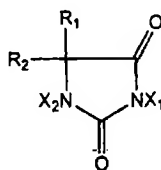
wherein R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of lower alkyl having 1 to 12 carbon atoms, and wherein X<sub>1</sub> and X<sub>2</sub> are independently selected from the group consisting of bromine, chlorine and hydrogen, and at least one of X<sub>1</sub> and X<sub>2</sub> being bromine or chlorine.

14. (Thrice Amended) In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is p-toluenesulfonamide, dimethylhydantoin, methylethylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is chlorine gas, bromine, bromine chloride, an alkali metal or alkaline earth metal hypohalite, a halogenated hydantoin, a halogenated cyanurate, or halogenated cyanuric acid and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation, wherein the N-hydrogen compound is directly added to the slurry before or after the addition of the slimicide or with the slimicide in a mixture consisting essentially of the slimicide and the N-hydrogen compound.

16. (Thrice Amended) In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is p-toluenesulfonamide, dimethylhydantoin,



methylethylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is a halogenated hydantoin of the formula



wherein R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of lower alkyl having 1 to 12 carbon atoms, wherein X<sub>1</sub> and X<sub>2</sub> are independently selected from the group consisting of bromine and chlorine, and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation, wherein the N-hydrogen compound is directly added to the slurry before or after the addition of the slimicide or with the slimicide in a mixture consisting essentially of the slimicide and the N-hydrogen compound.

**REMARKS**

Reconsideration of this reissue application is respectfully requested. Claims 2-4, 8, 11, 12, and 14-16 are pending in this reissue application.

Claims 3, 4, and 8 have been amended to depend from claim 14 instead of claim 16. During the prior reexamination proceeding, claims 3, 4, and 8 were amended to depend from then pending claim 16, which was renumbered as claim 14 in the reexamination certificate. See the Amendments dated February 3, 1999 and May 20, 1999 submitted herewith as Exhibits A and B. Due to a PTO error, the reexamination certificate states that claims 3, 4, and 8 depend from claim 16 (rather than claim 14). The present amendment corrects this PTO error.

Claims 2-4, 8, 11, 12, and 14-16 have been rejected as being based upon a defective reissue declaration under 35 U.S.C. §251. The Examiner alleges that both of the reissue declarations filed in this case are defective because they do not state that Applicant is the sole inventor. Applicant submits herewith a substitute reissue declaration, stating that the Applicant is the *sole* inventor.

The Examiner further alleges that the amendments filed on January 10, 2002 and March 4, 2003 fail to comply with 37 CFR §1.173(b). The Examiner notes that the word "from" is missing in line 2 of each claim before "95." Claims 14 and 16 as recited in this amendment include the word "from" before "95."

Application No.: 10/044,594

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Docket No.: 5408/0A237US2

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Dated: November 18, 2003

Respectfully submitted,

By 

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### STATUS OF CLAIMS AND SUPPORT FOR CLAIMS CHANGES

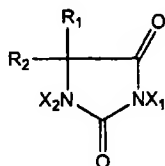
**PURSUANT TO 37 C.F.R. §1.173(c)**

2. The papermaking process of claim 14 wherein a mixture of the slimicide and the N-hydrogen compound is formed just prior to the addition to said circulating water slurry.

3. The papermaking process of claim 14 wherein the slimicide is chlorine gas or sodium hypochlorite.

4. The papermaking process of claim 14 wherein from 0.1 to 10 ppm of active slimicide (expressed as  $Cl_2$ ) is maintained in the circulating water slurry.

8. The papermaking process of claim 14 wherein said slimicide is a halogenated hydantoin of the formula:



11. The papermaking process of claim 8 wherein the halogenated hydantoin contains bromochlorodimethylhydantoin.

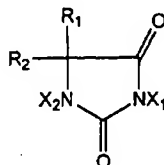
12. The papermaking process of claim 8 wherein the halogenated hydantoin is a mixture of dichlorodimethylhydantoin and dichloroethylmethylhydantoin.

14. In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is p-toluenesulfonamide, dimethylhydantoin, methylethylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is chlorine gas, bromine, bromine chloride, an alkali metal or alkaline earth metal hypohalite, a halogenated hydantoin, a halogenated cyanurate, or halogenated cyanuric acid and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation, wherein the N-hydrogen compound is directly added to the slurry before or after the addition of the slimicide or with the slimicide in a mixture consisting essentially of the slimicide and the N-hydrogen compound.

15. The papermaking process of claim 14 wherein the slurry is at a pH of from about 5.0 to 5.5.

16. In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is p-toluenesulfonamide, dimethylhydantoin, methylethylhydantoin, cyanuric acid, succinimide, urea,

4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is a halogenated hydantoin of the formula



wherein R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of lower alkyl having 1 to 12 carbon atoms, wherein X<sub>1</sub> and X<sub>2</sub> are independently selected from the group consisting of bromine and chlorine, and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation, wherein the N-hydrogen compound is directly added to the slurry before or after the addition of the slimicide or with the slimicide in a mixture consisting essentially of the slimicide and the N-hydrogen compound.

As discussed in the remarks section of this amendment, claims 3, 4, and 8 were amended during the prior reexamination proceeding to depend from claim 14 in the reexamination certificate (then pending claim 16), but due to a PTO error, the reexamination certificate states that these claims depend from claim 16. This amendment corrects the PTO error in the reexamination certificate.

# **EXHIBIT B**



US005565109B1

**REEXAMINATION CERTIFICATE (3940th)****United States Patent** [19][11] **B1 5,565,109****Sweeny**[45] Certificate Issued **Nov. 23, 1999**

[54] **HYDANTOIN-ENHANCED HALOGEN  
EFFICACY IN PULP AND PAPER  
APPLICATIONS**

1 358 617 7/1974 United Kingdom .

**OTHER PUBLICATIONS**

Chemical Abstract No. 30168q, 1990.

Feb. 28, 1997, Label for Lonza, Inc.'s DANTOBROM, EPA  
Reg.No.6836-117.Feb. 28, 1997, Label for Lonza, Inc.'s DANTOBROM RW,  
EPA.Reg.No.6836-115.Feb. 1, 1982, 1982 Annual Meeting of Cooling Tower  
Institute Article, (Matson).

[75] Inventor: **Philip G. Sweeny**, Hackettstown, N.J.

[73] Assignee: **Lonza Inc.**, Fair Lawn, N.J.

**Reexamination Request:**

No. 90/004,700, Jul. 22, 1997

**Reexamination Certificate for:**Patent No.: **5,565,109**Issued: **Oct. 15, 1996**Appl. No.: **08/323,459**Filed: **Oct. 14, 1994***Primary Examiner*—Peter A. Hruskoci

[57]

**ABSTRACT**

Free halogen sources (e.g., sodium hypochlorite and chlorine) added as slimicides in high organic component process streams such as pulp and paper processing are rendered more efficacious by the addition of selected N-hydrogen compounds (namely, 5,5-dimethylhydantoin, 5-ethyl-5-methylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, and glycouril) to the process stream. The latter compounds may be added to the process stream before or after the slimicide is added or combined with the slimicide and added directly thereto. The direct use of halogenated hydantoins has also been found to provide improved efficacy relative to free halogen sources. In addition, absorbable organic halogen by-products are reduced.

[51] **Int. Cl.<sup>6</sup>** ..... **C02F 1/50**

[52] **U.S. Cl.** ..... **210/755; 162/161; 210/754;**  
210/756; 210/764

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

5,565,109 10/1996 Sweeny ..... 210/755

**FOREIGN PATENT DOCUMENTS**

56-31492 3/1981 Japan .



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# REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

THE PATENT IS HEREBY AMENDED AS  
INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

ONLY THOSE PARAGRAPHS OF THE  
SPECIFICATION AFFECTED BY AMENDMENT  
ARE PRINTED HEREIN.

Column 2, lines 16-29:

In another embodiment of the instant invention, it has been discovered that certain halogenated N-hydrogen compounds per se also serve as outstanding slimicides for the treatment of circulating water containing organic matter such as in the pulp and paper industry. These compounds show enhanced efficacy over the hypochlorite in these applications. This result is particularly surprising since organic matter, generally over 0.2 wt. % and frequently over 0.5 wt. %, would be expected to interfere with the biocidal efficacy of such compounds. Typically, *in the case of papermaking*, these processing streams have from 0.2 to 3 wt. % organic matter, most frequently from 0.5 to 2 wt. %, comprised of approximately 95-99% pulp fiber as well as additional materials such as sizing rosin and starch.

AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

Claims 1, 5-7, 9, 10 and 13 are cancelled.

Claims 2-4, 8, 11 and 12 are determined to be patentable as amended.

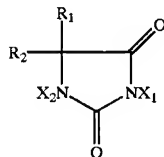
New claims 14-16 are added and determined to be patentable.

2. The [method] *papermaking process* of claim [1] 14 wherein [the] a mixture of the slimicide and the N-hydrogen compound is formed just prior to the addition to said circulating water [system] *slurry*.

3. The [method] *papermaking process* of claim [1] 16 wherein the slimicide is chlorine gas or sodium hypochlorite.

4. The [method] *papermaking process* of claim [1] 16 wherein from 0.1 to 10 ppm of active slimicide (expressed as Cl<sub>2</sub>) is maintained in the circulating water [system] *slurry*.

8. The [method] *papermaking process* of claim [1] 16 wherein said slimicide is a halogenated hydantoin of the formula:



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wherein R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of lower alkyl having 1 to 12 carbon atoms, and wherein X<sub>1</sub> and X<sub>2</sub> are independently selected from the group consisting of bromine, chlorine and hydrogen, and at least one of X<sub>1</sub> and X<sub>2</sub> being bromine or chlorine.

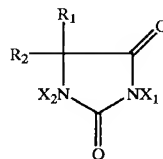
11. The [method] *papermaking process* of claim 8 wherein the halogenated hydantoin contains bromochlorodimethylhydantoin.

12. The [method] *papermaking process* of claim 8 wherein the halogenated hydantoin is a mixture of dichlorodimethylhydantoin and dichloroethylmethylhydantoin.

14. In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is *p*-toluenesulfonamide, dimethylhydantoin, methylethylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is chlorine gas, bromine, bromine chloride, an alkali metal or alkaline earth metal hypohalite, a halogenated hydantoin, a halogenated cyanurate, or halogenated cyanuric acid and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation.

15. The *papermaking process* of claim 14 wherein the slurry is at a pH of from about 5.0 to about 5.5.

16. In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is *p*-toluenesulfonamide, dimethylhydantoin, methylethylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is a halogenated hydantoin of the formula



wherein R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of lower alkyl having 1 to 12 carbon atoms, wherein X<sub>1</sub> and X<sub>2</sub> are independently selected from the group consisting of bromine and chlorine, and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation.

\* \* \* \* \*